APPENDIX IV

TAB E

Affidavit of Dr. Dean H. Kenyon in Biology and Bio-Chemistry

State of California
County of San Mateo

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can be found means to invalidate such a law, say, as one mandating that students be taught that the earth is flat or that chattel slavery never existed in this country. It comes as news to me, however, that the Constitution forbids a state to require the teaching of truth -- any truth, for any purpose, and whatever the effect of teaching it may be. Because this is the holding that we endorse today, I decline to join in that endorsement and respectfully dissent.

E. GRADY JOLLY, Circuit Judge, Responding to Dissent:

First, as writer of the panel opinion, I offer my apologies to the majority of this court for aligning it with the forces of darkness and anti-truth. Second, I do not personally align myself with the dissenters in their commitment to the eternal search for truth through state edicts. Third, I commend to the dissenters a serious rereading of the majority opinion that they may recognize the hyperbole of the opinion in which they join. And, finally, I respectfully submit, the panel opinion speaks for itself, modestly and moderately, if one will allow its words to be carefully heard.

APPENDIX B. AFFIDAVITS (UNCONTROVERTED) FROM RECORD

IN THE UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF LOUISIANA

DON AGUILLARD, ET AL., *Plaintiffs*, v. EDWIN W. EDWARDS, ET AL., *Defendants*.

CIVIL ACTION No. 81-4787

SECTION H

1. AFFIDAVIT OF DR. DEAN H. KENYON IN BIOLOGY AND BIO-CHEMISTRY

STATE OF CALIFORNIA

COUNTY OF SAN MATEO

[R.D. 77 Ex. 1]

I, DEAN H. KENYON, make the following free and voluntary statement, after being duly sworn, and state on oath as follows:

A. *Personal*

1. *Name.* My name is DEAN H. KENYON, and I reside in San Mateo County, California. I am a biologist.

2. *General.* I make this Affidavit with the understanding that it is to be used in the above-styled case. All statements herein are within my personal knowledge (including the types of knowledge on which experts in my field typically rely in forming expert opinions on the subject). I am competent to testify to the facts recited in this Affidavit.

B. *Academic Credentials*

3. *Academic Background.* My Ph.D. degree was earned in biophysics from Stanford University in 1965, and my Bachelor of Science degree from the University of Chicago in physics in 1961. In 1965 and 1966 I did postdoctoral study as a National Science Foundation postdoctoral fellow at the University of California at Berkeley in the chemical origins of life, performing original experimentation on the origin of life. I served as a Visiting Scholar at Trinity College of Oxford University in 1974, on the subject of the reception of Darwinism in England.

4. *Professional Positions.* I am a full Professor of Biology at San Francisco State University, and have been such since 1974. I was an Assistant Professor from 1966 to 1969, and an Associate Professor from 1969 through 1974. I have taught undergraduate courses on the origin of life, evolution, the Darwinian revolution, introductory biophysics, cell biology, human biology, history of biology, and bioethics; and graduate school courses or seminars in biogenesis, cellular biophysics, photobiology, comparative biochemistry, carcinogenesis, biomagnetism, and biological effects of gravity.

5. *Publications.* I published a book entitled *Biochemical Predestination* in 1969, along with G. Steinman, which argued in favor of biochemical evolution. The Preface to the Russian edition was written by A. I. Oparin, an international expert in the field. Based on my original research on biochemical evolution, I have published numerous articles on or related to the subject in such publications as Photochemistry and Photobiology, Biochimica et Biophysica Acta, Laboratory of Chemical Biodynamics Quarterly, Enzymologia, Perspectives in Biology and Medicine, Science (Book Review), Origins of Life, Journal of Molecular Evolution, and a chapter in *The Origin of Life and Evolutionary Biochemistry*.

C. *Summary*

6. *Scientific Nature of Creation-Science and Evolution.* It is my professional opinion, based on my original research, study, and teaching, that creation-science is as scientific as evolution, although it currently does not have the benefit of the volume of research that has been carried out under evolutionist presuppositions. It is my conviction that if any professional biologist will take adequate time to examine carefully the assumptions upon which the macroevolutionary doctrine rests, and the observational and laboratory evidence that bears on the problem of origins, he/she will conclude that there are substantial *reasons for doubting* the truth of this doctrine. Moreover, I believe that a scientifically sound creationist view of origins is not only possible, but is to be *preferred* over the evolutionary view.

7. *Nonreligious Nature of Creation-Science and Evolution.* It is my opinion, although not in the area of my expertise, that creation-science is as nonreligious as evolution.

8. *Educational Value of Creation-Science and Evolution.* It is also my conclusion that balanced presentation of creation-science and evolution is educationally valuable, and in fact is more educationally valuable than indoctrination in just the viewpoint of evolution. Presentation of alternate scientific explanations has educational benefit, and balanced presentation of creation-science and evolution does exactly that. Creation-science can indeed be taught in the classroom in a strictly scientific sense, and a text book can present creation-science in a strictly scientific sense, either as a supplement or as part of a balanced presentation text.

D. *Definitions of Creation-Science and Evolution*

9. *Definitions of Creation-Science and Evolution.* Creation-science means origin through abrupt appearance in complex form, and includes biological creation, biochemical creation (or chemical creation), and cosmic creation. Evolution-science is equivalent to evolution. Evolution is generally understood by scientists (although some would disagree) to include biological evolution (or organic evolution) from simple life to all plants and animals, biochemical evolution (or chemical evolution or prebiotic evolution of the first life), and cosmic evolution (including stellar evolution) (of the universe). Creation-science does not include as essential parts the concepts of catastrophism, a world-wide flood, a recent inception of the earth or life, from nothingness (ex nihilo), the concept of kinds, or any concepts from Genesis or other religious texts. The subject of origins is a part of evolution, and the origin of the first life and the origin of the universe are generally regarded by the scientific community as part of evolution.

10. *Sole Alternative to Scientific Explanations.* It is not only my professional opinion but that of many leading evolutionist scientists, at present and in the past, that creation-science and evolution are the sole scientific alternative explanations, although each includes a variety of approaches. Either plants and animals evolved from one or more initial living forms (biological evolution), or they were created (biological creation). Either the first life evolved from nonliving molecules (biochemical evolution), or it was created (biochemical creation). Either the universe evolved from the big bang or other initial state (cosmic evolution), or it was created (cosmic creation). Although some individuals hold to "theistic evolution" and other viewpoints, either these viewpoints are approaches under evolution or creation-science or they combine elements of evolution with elements of creation-science.

E. *Comparable Scientific Nature of The Concepts of Biological Creation and Biological Evolution*

11. *Introduction.* We tend too easily to forget that creationist views of origins predominated in scientific circles before the publication of Darwin's *On the Origin of Species* in 1859 (Gillespie 1979). The *leading scientists* of Europe and the United States were creationist scientists, and they defended their views with scientific evidence and argument. Examples include Sir Richard Owen, Baron Georges Cuvier and Louis Agassiz, who each made outstanding contributions to his field (Eiseley 1958). After 1859 many scientists came to accept Darwin's naturalistic view of origins, although Owen, Agassiz and others resisted the new doctrine (Cuvier died in 1832). Gradually, creationist scientific interpretations of nature all but disappeared from university science courses.

12. *Creationist Scientists and Scientific Data.* Although students generally hear only one side on the origins question, increasing numbers of scientists are now abandoning evolution for a new scientific version of creationism. Creationist scientists now number in the hundreds, possibly in the thousands, in the States and in other countries. This extraordinary development, I believe, has resulted largely from analysis of new scientific data not available to Darwin (or to his followers until relatively recently), especially chemical information bearing on the origin of first life and paleontological and other information bearing on biological origins. In sum, biological creation is scientific, and in fact is scientifically stronger than biological evolution.

1. *Biological Evolution*

13. *Macroevolution and Microevolution.* Macroevolution is evolutionary change above the species level, including the alleged transformation from unicellular organisms to invertebrates, to vertebrate fish, to amphibians, to reptiles, to birds and mammals, to primates, to humans (biological macroevolution). Microevolution is change within local populations at or below the species level. Creationist scientists do not dispute, but accept, microevolution. In fact creationist scientists regard much of what Darwin wrote to be basically correct. Moreover, they acknowledge the validity of most of the research described in the journals of evolutionary biology. Outside the subject of evolution, there is substantial agreement between the two sides on at least 90% of the subject matter of the biological sciences. So there is the basis for a mature and productive discussion of the origins question, outside as well as inside the classroom.

14. *Paleontological Considerations.* Fossils are the only direct evidence we have that bears on the question of whether macroevolution actually happened. Charles Darwin and T. H. Huxley were well aware of the *absence of transition forms* in the fossil record known in their day. In *On the Origin of Species* Darwin wrote:

> Why then is not every geological formation and every stratum full of such intermediate links? Geology assuredly does not reveal any such finely graduated organic chain, and this is perhaps the most obvious and gravest objection which can be urged against my theory. The explanation lies, as I believe, in the extreme imperfection of the geologic record (1859:280).

Darwin went to great lengths to explain why he thought the fossil record was highly fragmentary and incomplete. But the early Darwinians expected many of the gaps to be filled in the future paleontological work.

15. *Adequacy of the Fossil Record.* Over 120 years of paleontological research have not provided any significant number of "missing links," and there are reasons for doubting the transition status of those few that have been found. We now have about 250,000 fossil species (Raup 1979) which may represent at least 1% of all the species that ever lived. Since some paleontologists now consider the fossil record to be reasonably complete (Stanley 1979:1), evolutionists are faced with a disturbing dilemma. Either macroevolution did not occur, or it occurred in such a way that it left no direct evidence of having occurred.

16. *Archaeopteryx as Best Link.* In response to the above line of reasoning evolutionists state that *Archaeopteryx* clearly demonstrates the macroevolutionary transition from reptiles to birds. In fact, they say, *Archaeopteryx* is the best example of a transition form in the vertebrate fossil record. It had teeth and a bony tail, both "reptilian characters," as well as true feathers, a feature restricted to birds. But *Archaeopteryx* was very likely capable of powered flight, judging from its relatively massive furcula and the asymmetric rachis of its primary flight feathers (Feduccia and Tordoff 1979; Olson and Feduccia 1979). Other fossil birds had teeth, although they are present in no modern form. Moreover, some reptiles do not have teeth. There is really no compelling reason for not considering *Archaeopteryx* an extinct true bird. Thus the gap between reptiles and birds will remain unbridged until such time as a fossil reptile with the *beginnings* of feathers may be found. The other macroevolutionary gaps in the vertebrate fossil record, including those in the so-called "horse series," are all as large or larger than the gap between reptiles and birds.

17. *Punctuated Equilibrium.* Given the choice presented by the fossil data, increasing numbers of evolutionists are adopting a new version of evolutionary theory (Gould 1977, 1980; Gould and Eldredge 1977). This new view is in sharp contrast to Darwin's belief that virtually all natural populations were slowly evolving continuously. Suddenly, for unknown reasons, small peripherally isolated populations of a given species rapidly evolved into new species, only a few of which survive, perhaps only one. The successful new species expand their numbers and remain in stasis for long periods of time during which the probability of their fossilization is quite high. But during the actual transition from one category of organism to another the evolving populations are so small and so rapidly changing that they do not leave any fossils to document the transition. In other words, in this new theory, it is postulated that the macroevolutionary process is such that it leaves no direct evidence of its occurrence. Thus we cannot hope to find the evidence we need to substantiate the theory! This odd idea is punctuated equilibria.

18. *Comparative Anatomical Considerations.* The striking anatomical similarities, e.g., in skeletal structure, among the vertebrates are interpreted by evolutionists to be indications of common ancestry. Indeed such morphological comparisons have long been the basis for the classification of organisms. Creationists, on the other hand, see the same data as evidence of a common structural plan or of basic conditions for life.

19. *Comparative Biochemical Considerations.* In recent years anatomical comparisons have been supplemented by comparative studies of proteins and nucleic acids isolated from a wide variety of species. Many evolutionists believe that this new molecular information is potentially more powerful than the older method of working out the presumed phylogeny of organisms. For example, phylogenetic trees have been constructed on the basis of comparative amino acid sequence data for the protein, cytochrome c, and on the basis of nucleotide sequences in DNA (Dobzhansky et al.

1977; 281-303). Such "molecular trees" have generally been broadly consistent with those based on comparative anatomy. But there are some impressive anomalies. Molecular trees do not provide independent or persuasive evidence for evolution.

20. *Other Considerations.* Macroevolutionists also generally raise arguments on the basis of phylogenetic reconstruction, classification, comparative embryology, population genetics, and artificial selection. Besides punctuated equilibria, other schools of macroevolutionist thought are neo-Darwinism's synthesis and in years past classical Darwinism. In contrast to these, many transformed cladists and non-Darwinians question macroevolution, and anti-evolutionists repudiate it. Another important issue is the mechanism of evolution, including (depending on the viewpoint of the evolutionist) some of the following factors: natural selection, mutation, genetic recombination, migration, and genetic drift, under the neo-Darwinian synthesis. Creationist scientists challenge that any or all of these factors can produce or explain macroevolution. A final critical issue is the alleged stages of macroevolution: from unicellular organisms to invertebrates, to vertebrate fish, to amphibians, to reptiles, to birds and mammals, to primates, to humans. Creationist scientists find the scientific evidence to undermine macroevolution and to support biological creation better at each stage.

21. *Conclusion.* Biological evolution is not compelling, and in fact is less scientifically plausible than biological creation.

2. *Biological Creation*

22. *Introduction.* The concept of biological creation is scientific, in my professional opinion, and is supported by affirmative scientific evidence and scientific interpretations thereof.

23. *Paleontological (Fossil) Considerations.* The fossil record reflects *systematic gaps* between categories of organisms. Harvard paleontologist Stephen J. Gould wrote:

> The extreme rarity of transitional forms in the fossil record persists as the trade secret of paleontology. The evolutionary trees that adorn our textbooks have data only at the tips and nodes of their branches; the rest is inference, however reasonable, not the evidence of fossils (1977:14).

The gaps are *systematic*, and occur down to the species level (Cf. Eldredge 1980). We now have vastly more fossil species than were known in Darwin's day, and yet the gaps have not been filled in. Not only does the fossil record exhibit systematic gaps, most fossil forms *appear abruptly* in the record, remain essentially unchanged for millions of years (assuming the conventional chronology to be correct), and then abruptly disappear (Gould 1977; Stanley 1979:99-100). This extraordinary situation directly supports creation-science.

24. *Morphological (Structural) Considerations.* Most populations of organisms at any given time are in *stasis* or genetic equilibrium, as the fossil record indicates. Extreme examples of stasis are the so-called "living fossils" such as coelacanths, horseshoe crabs, and *Kakabekia*. This rather systematic similarity of fossil forms to their modern descendants supports biological creation.

25. *Information Content Considerations.* The available evidence indicates that biologic information in polynucleotides (DNA and RNA) must have been impressed on these polymers from the "outside," as discussed below. Similarly, we would expect that the new information required for the origin of significantly more complex new species, genera, families, etc., cannot originate by naturalistic means. It is of course possible that new species, genera, and occasionally even families, may have arisen by natural means since the occurrence(s) of creation, provided that the new forms did not contain significantly more genetic information than their progenitors. Examples here might include Darwin's finches (some of which are known to interbreed in the wild leaving fertile offspring) (Bowman 1982), and the thousands of species of orchids. But changes involving significant increases in complexity and biologic information, such as the presumed, naturalistic transitions from unicellular organisms to invertebrates, fish to amphibians, or reptiles to mammals, are much more problematic. The vast information content of organisms is best explained by creation-science as Hoyle and Wickramasinghe point out (quoted in paragraph 40).

26. *Genetic Considerations.* Since Darwin's time evolutionists have argued that genetic variations among the individuals of a population, plus natural selection operating over thousands of generations, can result in macroevolutionary changes in evolving lineages. The basic assumption is that genomes can vary in an essentially unlimited way, so that among the viable variants there will be those that contain at least the beginnings of the genetic information required to build significant new anatomical structures. But we cannot demonstrate that this is the case. Virtually nothing is known about the presumed genetic mechanism of speciation (Lewontin 1974:12; Cf. King and Wilson 1975).

What we do know appears to be more consistent with the view that genomes can only vary within limits corresponding roughly to the level of genera or families, but possibly narrower depending upon the genome (species) in question. And let us dispose of a common misconception. The complete transmutation of even one animal species into a different species has never been directly observed either in the laboratory or in the field. All such attempts have ultimately proven fruitless, although in the case of fruit flies some degree of reproductive isolation of laboratory subpopulations has been achieved (Thoday and Gibson 1962). The field studies reported in the evolutionary journals involve *micro*evolutionary change, about which there is no dispute. In any case, even though we may have strong doubts about macroevolution because of the conclusions we have drawn concerning the origin of life, the issue must be decided on the basis of additional evidence.

27. *Comparative Unrelatedness Considerations.* The fields of classification, comparative anatomy, and comparative biochemistry have so many anomalies from evolutionary expectations as better to support the unrelatedness and separate origin of genera or families of organisms. For example, a comparison of amino acid sequences of luteinizing hormone-releasing hormone (LHRH) from several species showed (on the evolutionary view) that amphibians and mammals are more closely related than reptiles and mammals (King and Millar 1979). There are inconsistencies in other molecular trees as well, for example, in the tree based on cytochrome c (Ayala 1978). Molecular trees based on different substances should at least be consistent with one another.

Colin Patterson (1981) of the British Museum of Natural History maintains that molecular data do not lead to a clear understanding of phylogeny, but rather, in many cases, to "antiknowledge." Comparative sequence data for a given protein or nucleic acid can generate, with the help of a suitable computer program (i.e., one massaged with evolutionary theory), a number of different trees. The "correct" tree is often selected by noting which one most nearly matches the tree based on comparative anatomy. Moreover, different proteins may give rise to different trees. Again the "correct" tree is determined by prior "knowledge" of evolutionary relationships. Creationist scientists believe that the "inconsistencies" among the trees reflect the fact that the basic genera or families of living organisms were separately created. They also point out that in order for proteins isolated from different organisms to be identified as the same type of protein, they must share much of their amino acid sequences in common. So similarity of sequence does not necessarily imply common ancestry, but may reflect *common requirements of engineering design.*

28. *Conclusion.* These scientific considerations constitute the core of biological creation, and show it to be scientific and, in fact, more scientifically plausible than biological macroevolution.

F. *Scientific Nature of The Concepts of Biochemical Creation and Biochemical Evolution*

1. *Biochemical Evolution*

29. *Introduction.* Today we have a large body of chemical information bearing on the problem of the origin of life. It generally supports biochemical creation and undercuts biochemical evolution.

30. *The Haldane-Oparin Hypothesis.* The basis of modern experimental work on chemical origins of life is the Haldane-Oparin hypothesis (Kenyon and Steinman 1969:26-28). The Russian biochemist A. I. Oparin (1924, 1938) and the English biochemist J.B.S. Haldane (1929) proposed that the first living cells arose by a long, multistage process of prebiological chemical (or biochemical) evolution beginning with the simple gases of the Earth's early atmosphere. Molecular oxygen (O[2]) was presumed to have been absent. Various sources of energy, such as ultraviolet rays from the sun, the electrical energy of lightning, heat and radioactivity were thought to have caused the gases to react to form more complex organic substances such as amino acids, sugars, purines and pyrimidines. These substances, i.e., biomonomers, presumably accumulated in the primeval oceans forming an "organic soup" (Oparin 1957). Biomonomers presumably linked together to form the first proteins, nucleic acids and other biopolymers. The next stage in this hypothetical complexification of carbon compounds involved the aggregation of polymer molecules into microscopic units called "protocells." Competition among the protocells presumably led to the formation of the first living cells (Oparin 1957:301-341).

31. *Assumptions.* Some of the assumptions of the Haldane-Oparin hypothesis are as follows: (1) The Earth's primitive atmosphere either contained no molecular oxygen, or only trace amounts of it. This assumption is especially important since O[2] would have prevented any significant chemical evolution from the primitive gases to more complex compounds. (2) Large amounts of biomonomers accumulated on the surface of the primitive Earth in spite of the fact that the energy sources that promoted their synthesis from the primitive gases would even more effectively have destroyed them. (3) The "preference" of living matter for L-amino acids (rather than the mirror image D-amino acids) and for D-sugars must have developed during the overall process of chemical evolution. Proteins are built out of L-

amino acids exclusively, and only D-sugars occur in the nucleic acids. (4) Substantial amounts of primitive proteins and nucleic acids accumulated on the primitive Earth. (5) Some of the molecules in protocells contained biologic, i.e., genetic, information.

32. *The Miller Experiments.* In order to test the Haldane-Oparin hypothesis, Stanley Miller enclosed methane, ammonia, water vapor, and molecular hydrogen in a closed glass apparatus to simulate the hypothetical primitive atmosphere of the Earth (Miller 1953). The gases were supplied with a source of energy (electric discharge) and the chemical products were analyzed. Miller found some of the amino acids which occur in proteins. Subsequent work by Miller and many others has demonstrated the formation of small amounts of numerous organic compounds, including many simple biochemicals (Miller and Orgel 1974). In some experiments microscopic "protocell" units have been formed (Fox and Dose 1977; Kenyon and Nissenbaum 1976).

33. *Problems with Assumptions about Early Atmosphere.* Most of the assumptions of the Haldane-Oparin hypothesis are inconsistent with available evidence. For example, we now have evidence from some of the oldest rocks that the Earth's primitive atmosphere had significant amounts of O[2] (Clemmey and Badham 1982; Dimroth and Kimberley 1976).

34. *Problems with Assumptions about Primordial Soup.* Moreover, we have no geologic evidence for the existence of an "organic soup" (Corliss et al. 1981; Nissenbaum et al. 1975). It is likely that any biochemicals formed in the primitive atmosphere or oceans would have been destroyed by the very energy sources which formed them (Hulett 1969; Hull 1960).

35. *Problems with Assumptions of Experiments.* Only tiny amounts of biochemicals are formed in the Miller experiments, but a substantial fraction of the methane is converted to products (Miller and Orgel 1974). Most (60-80%) of the reacted carbon forms a nonbiological amber goo coating the inside of the apparatus (Folsome 1979; Folsome et al. 1975). This material represents the dominant trend of the chemistry in these experiments. Biopolymers, such as proteins and nucleic acids, are not detectable in the apparatus.

Most of the experimental conditions in such studies have been so artifically simplified as to have virtually no bearing on any actual processes that might have taken place on the primitive earth. For example, if one wishes to find a possible prebiotic mechanism of condensation of free amino acids to polypeptides, it is not likely that sugars or aldehydes would be added to the reaction mixture. And yet, how likely is it that amino acids (or any other presumed precursor substance) occurred anywhere on the primitive earth free from contaminating substances, either in solution or the solid state? The difficulty is that if sugars or aldehydes were also present polypeptides would not form. Instead an interfering cross-reaction would occur between amino acids and sugars to give complex, insoluble polymeric material of very dubious relevance to chemical evolution. This problem of potentially interfering cross-reactions has been largely neglected in much of the published work on the chemical origins of life. Other aspects of origin-of-life research have contributed to my growing uneasiness about the theory of chemical evolution. One of these is the enormous gap between the most complex "protocell" model systems produced in the laboratory and the simplest living cells. Anyone familiar with the ultrastructural and biochemical complexity of the genus *Mycoplasma*, for example, should have serious doubts about the relevance of any of the various laboratory "protocells" to the actual historical origin of cells. In my view, the possibility of closing this gap by laboratory simulation of chemical events likely to have occurred on the primitive earth is extremely remote. Another intractable problem concerns the spontaneous origin of the optical isomer preferences found universally in living matter.

36. *Problem of Origin of Information Content.* Finally, in this brief summary of the reasons for my growing doubts that life on earth could have begun spontaneously by purely chemical and physical means, there is the problem of the origin of genetic, i.e., biologically relevant, information in biopolymers. No experimental system yet devised has provided the slightest clue as to how biologically meaningful sequences of subunits might have originated in prebiotic polynucleotides or polypeptides. Evidence for some degree of spontaneous sequence ordering has been published, but there is no indication whatsoever that the non-randomness is biologically significant. Until such evidence is forthcoming one certainly cannot claim that the possibility of a naturalistic origin of life has been demonstrated.

2. *Biochemical Creation*

37. *Introduction.* The creationist scientific conclusion is that empirical data currently in hand demand the inference that the first living organisms were created. This view of the origin of life is based on a detailed analysis of laboratory information from molecular biology, biochemistry, organic chemistry, the simulation experiments on chemical evolution, as well as relevant aspects of physics, geology, astrophysics, probability and information theory.

38. *Information Content.* At the heart of the molecular activity of all living cells is the genetic coding and protein-synthesizing machinery which stores and translates biologic information. This information is contained in the specific linear sequences of the subunits of DNA, RNA and proteins. At least 20 different proteins are required for the replication of DNA. At least another 50 proteins are needed to transcribe and translate the information stored in the DNA molecules into the amino acid sequences of proteins (J. Fox 1978; Sheeler and Bianchi 1980). Among these proteins are the aminoacylsynthetases, the enzymes that link the various amino acids to their respective transfer RNA molecules. In the absence of even one of these enzymes, protein synthesis does not take place. The genetic code is actually read by the aminoacylsynthetases since they match an amino acid with its own transfer-RNA molecule. If we go back into the past to the first time the protein-synthesizing machinery functioned, we are faced with the problem of the origin of the necessary aminoacylsynthetases. Where did the proteins come from before the protein-synthesizing system originated? One can postulate that the necessary proteins formed abiotically in the primitive ocean, but there is virtually no experimental evidence for such a postulate. Another suggestion is that prebiotic DNA (or RNA) molecules that just happened to contain the biologic information for the synthesis of all the basic proteins of the living state spontaneously formed and were present in the same protocell. But again, the odds against such a process having occurred are overwhelmingly large, and experimental data are lacking.

39. *Analogy.* At this point it will be helpful to mention the oft-cited analogy between biologic information and printing. The statement that functional polynucleotides (nucleic acids) can spontaneously form is equivalent to the statement that the ink and paper of a printed page can organize themselves into a meaningful text. That is, the chemical and physical properties of ink on the surface of paper cause the ink to organize itself into an intelligible sequence of letters. On the contrary, we know that the pattern of ink markings on the page you are reading was impressed on the ink by the printing device. Preexisting, intelligently designed type was intelligently arranged to form the text. The information was impressed on the matter from the "outside." The DNA texts of the first living cells must have originated in an analogous way. The nucleotide sequences cannot be deduced from the chemical properties of the nucleotides (Polanyi 1967, 1968). The situation is the same for the amino acid sequences of those enzymes and other proteins that had to be already present in order for the first cycle of cellular protein synthesis to occur. Of course the properties of the molecules must be suitable for the roles they play in living matter, just as the properties of ink must be appropriate for its role on the printed page. However, among the properties of biomolecules and their subunits one will not find the property of spontaneous self-organization into the living state. The origin of printed texts, manufactured devices, and biomolecular systems require intelligent design and engineering knowhow (Wilder-Smith 1970). In each case the characteristic order of the system must be impressed on matter "from the outside."

40. *Probability.* Sir Fred Hoyle and Chandra Wickramasinghe have argued in their book *Evolution from Space* (1981) that the probability of the spontaneous origin of living matter can be no greater than one chance in 10<40,000>, and is probably much lower. Therefore, they conclude, the origin of life must have required an intelligence of some kind which was the source of the original biologic information. This intelligence designed the enzymes and other molecules of the living cell. The authors write that these probability and information content considerations both affirmatively support creation (their subtitle was "A Theory of Cosmic Creation") and undercut evolution:

> The theory that life was assembled by an intelligence has, we believe, a probability vastly higher than one part in 10<40,000> of being the correct explanation of the many curious facts discussed in preceding chapters. Indeed, such a theory is so obvious that one wonders why it is not widely accepted as being self-evident. The reasons are psychological rather than scientific (130).

Hoyle and Wickramasinghe further maintain that evolution of the first life on Earth into more complex forms could not have occurred without the influx of preformed genetic material from an extraterrestrial source. Obviously, in their view, one's reasoning about the origin of the first life can have profound implications for one's view on the subsequent evolution of life as well.

41. *Isomers.* The Miller experiments offer no clues concerning the preference of living matter for L-amino acids. All products for these experiments are precisely racemic, i.e., 50-50 mixtures of L- and D-forms (Dickerson 1978; Folsome 1979). The natural chemical tendencies of organic matter consistently produced racemic compounds. Many researchers have attempted to find plausible natural conditions under which L-amino acids would preferentially accumulate over their D-counterparts, but all such attempts have failed (Bonner 1972; Bonner et al. 1980). Until this crucial problem is solved, no one can say that we have found a naturalistic explanation for the origin of life. Instead, these isomer preferences point to biochemical creation.

42. *Chemical Tendency away from Life.* Creationist scientists maintain that laboratory studies have shown that simple organic matter does not move in the direction of the living state; it does move in other directions, the most

prominent of which is the formation of non-biological macromolecular material. Future research is not likely to disclose conditions under which pure water at 1 atmosphere of pressure will boil at 50 degrees C, or turn red. Likewise, future research is not likely to disclose plausible natural conditions under which carbonaceous matter can organize itself into living matter. Organic compounds have certain properties. They react in certain ways, and not in others. For example, a solution (or even a nearly dry mixture) of amino acids and sugars will form the non-biological substance melanoidin; it will not form polypeptide and polysaccharides. Methane, ammonia and water vapor bombarded with ultraviolet light will form small amounts of racemic amino acids; they do not form amino acids containing an excess of the L-isomer, as we have seen. Another consideration, which I will not discuss here, is the thermodynamic line of analysis relevant to biochemical creation.

43. *Conclusion.* These scientific considerations form the core of biochemical creation, and show that it is as scientific as chemical evolution, and in fact is preferable in scientific plausibility to chemical evolution. These are weighty issues of fact. Evidence often taken to support a naturalistic chemical origin of life, actually, upon close analysis, points in another direction, namely, toward the conclusion that the first life was created. The data of molecular biology, especially the details of the genetic-coding and protein-synthesizing systems, lend further powerful support to this view. Probability arguments applied to the problem of the origin of genetic information also confirm the creationist view of origins. Laboratory data and theoretic arguments concerning the origin of the first life lead one to doubt the evolution of subsequent forms of life. The fossil record and other lines of evidence confirm this suspicion. In short, when all the available evidence is carefully assessed in toto, the evolutionary story of origins appears significantly less probable than the creationist view.

G. *Educational Merit of Balanced Presentation of Creation-Science with Evolution*

44. *Biased Textbooks.* Many high school science texts contain whole chapters on evolution written in such a way as to give the student the impression that evolution is the only reasonable explanation of biologic origins. This unfortunate and unwarranted dogmatism is common today, although a few current high school texts briefly mention the creationist alternative. One rarely finds a balanced treatment of the creation-evolution controversy in university level biology textbooks.

45. *Educational Merit.* Creation-science has educational merit, can be taught in the classroom in a strictly scientific and nonreligious sense, and can be so presented in textbooks.

[Notarized signature not reproduced]

2. AFFIDAVIT OF DR. W. SCOT MORROW * IN BIOCHEMISTRY AND GENERALLY

STATE OF SOUTH CAROLINA

COUNTY OF SPARTANBURG

[R.D. 77 Ex. 2]

I, W. SCOT MORROW, make the following free and voluntary statement, after being duly sworn, and state on oath as follows:

A. *Personal*

1. My name is W. SCOT MORROW, and I reside in Spartanburg County, South Carolina. I am a biochemist.

2. I make this Affidavit with the understanding that it is to be used in the above-styled case. All statements herein are within my personal knowledge (including the types of knowledge on which experts in my field typically rely in forming expert opinions on the subject). I am competent to testify to the facts recited in this Affidavit.

B. *Academic Credentials*

3. *Education.* I earned my Ph.D. degree in biochemistry from the University of North Carolina at Chapel Hill in 1969. I earned an M.S. in analytical chemistry at St. Joseph's College in 1964, and a B.Sc. in chemistry in 1959 from Philadelphia College of Pharmacy and Science.

4. *Professional Experience.* I am an Associate Professor in the Chemistry Department of Wofford College, where I have taught since 1970. I have taught courses in biochemistry, physical biochemistry, physical chemistry, general